

Title: Mixed-initiative Activity Plan Generator For Mars Exploration Rovers Mission (MER)

Mixed-initiative Activity Plan Generation (MAPGEN), is an integrated Planning Tool (APGEN and ARC Planner) for MER that will include the mixed-initiative planning and scheduling capabilities for rovers and spacecraft. These capabilities include how to reason about decisions and preferences from multiple sources, how to specify and utilize user preferences, how to automate trade-off analyses, and how to provide these capabilities to the user. The work will be done in the context of constraint-based interval planning, which is well suited for mixed-initiative mission operations planning for the following reasons. First, this planning approach can handle and reason about complex, interacting activities that have temporal extent. Second, the approach uses timelines and attributes to model complex systems in a manner that is natural to human users. Third, the explicit representation of constraints and dependencies enables the user to observe and influence the reasoning process.

The objective of the work is to develop and deliver mixed-initiative planning and scheduling technology to MER, such that it will enable scientists to effectively construct high quality mission plans. The goal is to achieve as much of their science goals as possible, while satisfying all operations constraints. The expected benefits of the proposed technology are a reduction in mission cycle costs as well as an increase in the science productivity and reliability of missions.